THE

ONTARIO WATER RESOURCES

COMMISSION

BRIEF

on

THE ASPECTS OF POLLUTION

in the

RIDEAU RIVER SYSTEM

1967

BBNF

THE

ONTARIO WATER RESOURCES COMMISSION

BRIEF

on

THE ASPECTS OF POLLUTION

in the

RIDEAU RIVER SYSTEM

Water Quality Surveys Branch
Division of Sanitary Engineering

November 1967

TABLE OF CONTENTS

INTRODUCTION

This brief summarizes a number of existing reports and records concerned with the problem of pollution in various reaches of the Rideau River. Appended to the brief is a summary of the water samples considered. The following statements on water quality of the Rideau River are based on these results.

RIDEAU RIVER FLOWING TO OTTAWA RIVER

Summaries of the results of sampling programs conducted on the Rideau River and tributaries are appended to this brief.

(a) Headwaters

Available records show that no serious pollution exists in the headwaters of the Rideau River watershed above the towns of Perth and Smith's Falls.

(b) Town of Perth

The Town of Perth treats municipal sewage in three lagoons prior to discharging the effluent to the Tay River. On occasion industrial wastes discharged to the town's sewers adversely affect the operation of these lagoons. Subsequently, recommendations have been made, to the town, that an industrial waste by-law be adopted to control such discharges. Enforcement of such a by-law would prevent periodic degradation of the lagoon effluent. Water quality information on the Tay River in the vicinity of Perth shows that on several occasions coliform counts exceeding the OWRC objectives of 2400 coliform per 100 ml occur. Separation of the town's combined sewer system, and efficient chlorination of the lagoon effluent should improve the situation.

(c) Town of Smith's Falls

The Town of Smith's Falls is served by a combined sewer system and primary sewage treatment plant. The sewer system includes a number of overflows which discharge untreated sewage to the river during heavy runoff periods. Upstream of the town, bacterial and organic pollution is negligible. Coliform counts below Smith's Falls exceed the OWRC objectives. Plans are being prepared for the construction of a new sewage treatment plant at Smith's Falls. The completion of such a plant including adequate chlorination of the effluent should reduce the organic and coliform pollution problems at Smith's Falls. The separation of the existing combined sewage system would prevent raw sewage overflowing to the river at times of high runoff and further reduce pollution. Below Smith's Falls the BOD of the river is less than 4.0 ppm which is within the OWRC objective for river waters.

The dissolved oxygen levels in this section of the river remain at nearly 100 per cent saturation. A new sewage treatment plant would remove raw sewage solids from the river and reduce the BOD loading, but it is unlikely that such a plant would remove sufficient nutrients from the sewage effluent to prevent aquatic plant growth. The problem of nutrients in the Rideau River system is discussed later in this report.

(d) Village of Merrickville

The Village of Merrickville is served by a system of individual septic tanks and tile field disposal areas. Numerous premises employ unsatisfactory sewage disposal methods due to inadequate space and insufficient overburden for proper sub-surface systems. Such unsatisfactory practices take the form of private connections to local storm sewers or private outfalls to the river. In addition, industrial wastes have been entering the Rideau River via the village's storm sewer system. The OWRC has recommended that:

1. The village undertake a municipal sewage works programme.
2. The offending industry effect adequate in-plant treatment to reduce to an acceptable level the cyanide concentration presently in its effluent.

Available information indicates that the water quality of the Rideau River at Merrickville meets OWRC objectives.

(e) Town of Kemptville

The Town of Kemptville is served by a combined sewer system and a primary sewage treatment plant. The plant is overloaded, much of the overloading being due to periodic excessive organic discharges to the town sewers from local creameries. Recommendations have been forwarded by the OWRC that the town adopt an industrial waste by-law which would restrict the discharge of excessive organic waste to the town's sewer system. OWRC records show water quality in the Kemptville Creek to be seriously affected by present waste discharges. Excessive BOD and bacteria levels and low dissolved oxygen levels in the creek reflect the pollution problem. A combination of excessive organic discharges from the sewage treatment plant and low stream flows appear to be the major problem.

At present initial investigations are underway to determine the feasibility of locating a conservation dam above the town on the Kemptville Creek. A consulting engineer's report for the Rideau River Conservation Authority recommends that the dam be utilized for recreational purposes and low flow augmentation.

(f) Village of Richmond

The village of Richmond is situated on the Jock River, a tributary of the Rideau River. The village is served by a system of individual septic tanks and tile field disposal areas. Plans are underway to develop a municipal sewage system using a lagoon for sewage treatment. Recent sampling showed coliform counts in the Jock River in excess of the OWRC objectives. Developments of a municipal sewage treatment system should overcome existing problems.

(g) Ottawa Area

A sampling program on the Rideau River indicates that intermittent bacterial contamination of the river occurs. BOD was found to remain within the OWRC's 4 ppm objective, and dissolved oxygen concentrations in summer flow conditions averaged 6 ppm which is greater than the OWRC's objective minimum of 4 ppm.

(h) Sewage Control in Pleasure Boats

In addition to the OWRC efforts in the development of adequate waste treatment facilities for municipalities and industry the control of pollution from pleasure boats has recently come under OWRC jurisdiction. As of June 1, 1968 pleasure crafts will be required to have sewage holding tanks or sewage treatment devices. A copy of the Ontario Water Resources Commission Act and a copy of a booklet "Facts for Boaters on Sewage Control in Pleasure Boats" is appended for your information.

(i) Nutrients

Present sewage treatment techniques effectively reduce bacterial and organic pollution, but to date little has been accomplished with respect to nutrient removal.

Experience has shown that the following concentrations of nutrients may promote excessive algal growths under favourable environmental conditions:

Nutrient	Concentration
Inorganic Nitrogen as nitrite and nitrate	0.28 ppm
Soluble Phosphorus as phosphate	0.01 ppm

Nutrient concentrations reach this level at several points in the Rideau River and its tributaries as illustrated by the following table:

NUTRIENT CONCENTRATIONS (PPM)

SAMPLING STATION	SOLUBLE PHOSPHORUS			INORGANIC NITROGEN (AS NO_2)			INORGANIC NITROGEN (AS NO_3)		
	No.of Samples	Max.	Mean	No.of Samples	Max.	Mean	No.of Samples	Max.	Mean
Rideau R. at Sussex Drive, Ottawa	12	0.33	0.10	12	0.03	0.01	12	0.25	0.10
Rideau R. at Hwy 43 East Smith's Falls	16	1.55	0.47	9	0.68	0.10	9	0.3	0.11
Rideau R. at Old Sly Locks upstream of Smith's Falls STP.	7	0.18	0.06	2	0.01	0.01	6	0.25	0.10
Rideau R. 20 miles above Smith's Falls at Narrows Lock	9	0.08	0.04	6	0.03	0.01	9	0.28	0.10
Kemptville Cr. at Hwy 43, Kemptville	14	6.10	1.30	6	0.20	0.04	8	0.20	0.11
Tay R. at Perth	14	0.30	0.10	-	---	---	5	0.15	0.07

At all sampling stations considered, 90 per cent of the samples taken had concentrations of soluble phosphorus exceeding 0.01 ppm. The mean inorganic nitrogen (as NO_2 and NO_3) concentrations at all sampling stations were less than 0.28 ppm.

Except for the Tay River at Perth, all stations produced some samples having concentrations of inorganic nitrogen exceeding 0.28 ppm.

The worst nutrient problems appear to exist downstream from Smith's Falls in the Rideau River, and at Kemptville in the Kemptville Creek.

Soluble phosphorus and inorganic nitrogen continue to enter receiving waters and foster aquatic plant growths. Consideration should be given to minimizing the supply of nutrients entering the river.

DRAINAGE BASIN STUDIES

Within the framework of the policy guidelines recently adopted by the OWRC, a drainage basin study has been tenatively scheduled for the Rideau River Basin for 1969. In accordance with these guidelines, the following steps will be carried out in the order indicated.

(a) the demands and quality needs of water uses (existing and future) are determined for the drainage basin. Uses include:

public and industrial water supplies,
recreation and aesthetics,
fish, aquatic and wildlife,
agriculture, and
wastewater disposal.

(b) the magnitude of the changes occurring and expected to occur (from population forecasts) under varying waste load inputs to the receiving water at any point downstream is defined;

(c) constraints are then placed on the amounts of wastewater that may be discharged by each major user;

(d) the costs of the necessary works and benefits to be derived are finally determined and recommendations made. The recommendations result in specific stream loadings for the guidance of consultants in waste treatment designs.

The definition of specific limits (Item d) applicable to each water user will result in:

(i) greater attention being given to designs and operation of pollution control works and other quality control structures;

(ii) increased confidence that water use conflicts can be resolved;

(iii) judicious usage of waters for waste assimilation so that orderly growth of municipalities and industries in desirable locations will be possible.

Until such a detailed plan can be established, the OWRC conducts a continuous program of pollution investigation in the Rideau River Basin. Negotiations are presently underway with the Quebec Water Board regarding a joint survey to investigate the water uses, requirements, and pollution problems in the Ottawa River Basin. It is possible that this survey will eventually encompass the Rideau River waterway which is tributary to the Ottawa River. In the proposed investigation of the Ottawa River Basin, studies will be undertaken within the frame of reference of the latest OWRC policy guidelines.

A copy of the new guidelines on water quality are appended for your consideration.

CATARAQUI DRAINAGE AREA OF THE RIDEAU RIVER AND CANAL SYSTEM

The section of the Rideau River and canal system flowing to the Cataraqui River is sparcely populated. No major sources of pollution in this area are indicated by the sampling programs now underway.

Summaries of the results of sampling programs conducted on the Cataraqui watershed are appended to this brief.

(a) Organic Pollution

A number of small communities in the watershed have individual private sewage treatment systems. Minor pollution problems exist in the following areas.

The wastes from a small seasonal dairy operation in the Village of Battersea are discharged untreated to the river.

Some organic pollution reaches the watershed at the Village of Seeley Bay. The quantity and source of this pollution is unknown.

A Federal correction farm is located at the settlement of Joyceville on the Cataraqui River. Waste from the farm is treated at an activated sludge sewage treatment plant prior to the effluent being discharged to the river.

The City of Kingston is situated on the Cataraqui and St. Lawrence Rivers. Municipal sewage and industrial wastes from the city receive primary treatment prior to being discharged to the St. Lawrence River. The Frontenac Floor and Wall Tile Company at Kingston has recently installed settling tanks to reduce the suspended solids content of the waste which it discharges to the Cataraqui River.

The City of Kingston operates a sanitary land fill, located adjacent to the Cataraqui River. This site is monitored to detect any river pollution which might result from the operation.

Organic pollution does not appear to be a problem in the Cataraqui River watershed.

(b) Nutrients

The following table summarizes the nutrient concentrations at several points in the Cataraqui River watershed:

NUTRIENT CONCENTRATION (PPM)

SAMPLING STATION	SOLUBLE PHOSPHORUS			INORGANIC NITROGEN ($AS NO_2$)			INORGANIC NITROGEN ($AS NO_3$)		
	No.of Samples	Max.	Mean	No.of Samples	Max.	Mean	No.of Samples	Max.	Mean
Cataraqui R. at Hwy #2, Kingston	17	0.20	0.05	7	0.01	0.01	9	0.18	0.10
Cataraqui R. at Dam at Kingston Mills	11	0.045	0.03	7	0.01	0.01	11	0.18	0.07
Cataraqui R. at Bridge below Brewers Mills	4	0.02	0.01	3	0.01	0.01	2	0.01	0.01
Cataraqui R. at Jones Falls	7	0.07	0.04	4	0.01	0.01	4	0.20	0.09

At all sampling stations considered, the mean soluble phosphorus concentrations equal or exceed 0.01 ppm. The inorganic nitrogen as (NO_2 and NO_3) concentration for all samples considered was less than 0.28 ppm.

Reports indicate that during the late summer heavy algal growths occur in the Cataraqui River downstream from Brewers Mills.

CONCLUSIONS

The portion of the Rideau River and Canal system draining to the Cataraqui River poses no serious pollution problems which would interfere with the recreational use of the waterway. However, further downstream the recreational value of the Cataraqui River is impeded by algal growths.

APPENDIX

WATER QUALITY DATA

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Rideau River, Sussex Drive, Ottawa	26/10/66 to 11/ 8/67	MF Coliform per 100 ml.	4	150	37,000	
		BOD 5	6	0.7	2.8	2.0
		Solids				
		- Total	6	120	296	221
		- Suspended	6	5	54	18
		Conductivity - mhos/CM^3	6	240	348	303
		Turbidity	6	3.3	14.0	12.2
		Phosphorus as PO_4				
		- Total	5	0.14	0.58	0.35
		- Soluble	6	0.02	0.33	0.10
		Nitrogen as N				
		- Free Ammonia	6	0.13	0.39	0.24
		- Total Kjeldahl	6	0.71	1.80	1.05
		- Nitrite	6	0.00	0.02	0.01
		- Nitrate	6	0.02	0.25	0.10
		Chlorides as Cl	5	6	10	8
		Hardness as $CACO_3$	5	116	180	148
		Alkalinity as $CACO_3$	5	101	145	125
		Iron as Fe	5	0.15	1.58	0.73
		pH	5	7.8	8.3	8.0
		Phenols (ppb)	1	---	---	6
		Dissolved Oxygen	6	5.0	11.0	8.0
		Sulphate as SO_4	1	---	---	29

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Rideau River Hwy 43, East of Smith's Falls	1/12/64 to 5/9/67	MF Coliform per 100 ml.	18	110	6,000,000	
		BOD 5	21	0.4	16	3.7
		Solids				
		- Total	17	112	268	180
		- Suspended	20	1	100	21
		Conductivity - mhos/CM^3	11	218	318	245
		Turbidity Units	19	1.4	24	7.6
		Phosphorus as PO_4				
		- Total	16	0.08	1.60	0.79
		- Soluble	16	0.00	1.55	0.47
		Nitrogen as N				
		- Free Ammonia	19	0.00	1.18	0.38
		- Total Kjeldahl	18	0.06	3.50	1.77
		- Nitrite	19	0.00	0.68	0.04
		- Nitrate	19	0.00	0.30	0.05
		Chlorides as Cl	16	5	19	10
		Hardness as $CACO_3$	8	106	144	117
		Alkalinity as $CACO_3$	7	94	101	97
		Iron as Fe	8	0.05	1.78	0.71
		pH	8	7.3	8.2	7.6
		Phenols (ppb)	3	4	12	8
		Dissolved Oxygen	20	4	16	8.9
		Sulphate as SO_4	1			28

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Rideau River Old Sly Locks Upstream Smith Falls STP.	31/8/66 to 5/ 9/67	MF Coliform per 100 m.	7	110	60,000	
		BOD 5	9	0.7	3.8	1.8
		Solids - Total	6	104	220	135
		- Suspended	8	1	220	135
		Conductivity - mhos/CM^3	9	197	253	221
		Turbidity Units	7	1.4	5.5	3.6
		Phosphorus as PO_4 - Total	7	0.06	0.66	0.17
		- Soluble	6	0.01	0.18	0.07
		Nitrogen as N - Free Ammonia	8	0.06	0.23	0.16
		- Total Kjeldahl	7	0.46	2.30	1.07
		- Nitrite	7	0.00	0.01	0.00
		- Nitrate	8	0.00	0.25	0.06
		Chlorides as Cl	7	1	9	5
		Hardness as $CACO_3$	6	106	264	140
		Alkalinity as $CACO_3$	5	87	112	94
		Iron as Fe	6	0.10	1.13	0.36
		pH	6	7.7	8.8	8.1
		Phenols (ppb)	2	2	2	2
		Dissolved Oxygen	8	8.0	10.0	8.9
		Sulphate as SO_4	1			28

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Rideau River Narrows Lock 20 miles upstream from Smith's Falls	6/6/66 to 8/9/67	MF Coliform per 100 ml.	12	4	1,300	
		BOD 5	13	0.6	2.8	1.6
		Solids - Total	13	80	196	146
		Solids - Suspended	10	1	15	8
		Conductivity - mhos/CM^3	11	209	240	222
		Turbidity Units	10	1.3	10	3.7
		Phosphorus as PO_4 - Total	13	0.00	0.28	0.12
		Phosphorus as PO_4 - Soluble	13	0.00	0.08	0.03
		Nitrogen as N - Free Ammonia	13	0.00	0.46	0.12
		Nitrogen as N - Total Kjeldahl	12	0.58	2.80	0.89
		Nitrogen as N - Nitrite	13	0.00	0.03	0.01
		Nitrogen as N - Nitrate	13	0.00	0.28	0.07
		Chlorides as Cl	11	3	6	5
		Hardness as $CACO_3$	-	-	-	-
		Alkalinity as $CACO_3$	-	-	-	-
		Iron as Fe	-	-	-	-
		pH	-	-	-	-
		Phenols (ppb)	-	-	-	-
		Dissolved Oxygen	13	7	11	9.4
		Sulphate as SO_4	-	-	-	-

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Tay River in Perth	1/12/64 to 3/7/67	MF. Coliform per 100 ml.	19	130	670,000	
		BOD 5	20	1	13	2.2
		Solids - Total	17	78	354	153
		Solids - Suspended	19	1	159	16
		Conductivity - mhos/CM^3	11	156	480	206
		Turbidity Units	18	1.1	10.0	3.7
		Phosphorus as PO_4 - Total	17	0.02	0.64	0.17
		Phosphorus as PO_4 - Soluble	16	0.00	0.30	0.09
		Nitrogen as N - Free Ammonia	18	0.00	0.23	0.09
		Nitrogen as N - Total Kjeldahl	17	0.40	1.92	0.71
		Nitrogen as N - Nitrite	17	0.00	0.01	0.00
		Nitrogen as N - Nitrate	17	0.00	0.15	0.02
		Chlorides as Cl	16	3	91	11
		Hardness as $CACO_3$	7	78	110	82
		Alkalinity as $CACO_3$	6	65	154	87
		Iron as Fe	7	0.00	2.95	0.52
		pH	7	7.3	8.2	7.7
		Phenols (ppb)	3	0	4	3
		Dissolved Oxygen	20	7	15.4	9.4
		Sulphate as SO_4	1			27

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Kemptville Cr., At Hwy 43, Kemptville	1/12/64 to 31/7/67	MF Coliform per 100 ml.	18	650	560,000	
		BOD 5	18	1.8	27	6.4
		Solids - Total	15	154	390	186
		Solids - Suspended	17	2	61	20.5
		Conductivity - mhos/CM^3	9	255	600	392
		Turbidity Units	17	1.1	32	7.8
		Phosphorus as PO_4 - Total	15	0.08	7.20	1.48
		Phosphorus as PO_4 - Soluble	14	0.02	6.10	1.30
		Nitrogen as N - Free Ammonia	16	0.01	3.28	0.58
		Nitrogen as N - Total Kjeldahl	16	0.06	5.00	2.19
		Nitrogen as N - Nitrite	16	0.00	0.20	0.02
		Nitrogen as N - Nitrate	16	0.00	0.20	0.06
		Chlorides as Cl	15	4	43	17.7
		Hardness as $CACO_3$	6	120	236	178
		Alkalinity as $CACO_3$	6	121	227	168
		Iron as Fe	6	0.10	1.15	0.46
		pH	6	7.2	8.2	7.7
		Phenols (ppb)	2	0	2	1
		Dissolved Oxygen	19	1.0	16.8	6.6
		Sulphate as SO_4	1			20

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO.OF SAMPLES	MIN.	MAX.	MEAN
Cataraqui R. at Highway No. 2, Kingston	30/11/64 to 18/ 9/67	MF Coliform per 100 ml.	16	50	6,000	
		BOD 5	18	1.0	2.8	1.9
		Solids				
		- Total	18	60	246	181
		- Suspended	17	3	69	17
		Conductivity - mhos/cm^3	11	256	323	286
		Turbidity Units	16	2.3	29	10.0
		Phosphorus as PO_4				
		- Total	16	.02	.34	.13
		- Soluble	15	.00	.20	.05
		Nitrogen as N				
		- Free Ammonia	17	.02	.30	.14
		- Total Kjeldahl	18	.39	1.00	.72
		- Nitrite	17	.00	.01	.00
		- Nitrate	18	.00	.18	.05
		Chloride as Cl	17	5	28	17
		Hardness as $CaCO_3$	1			122
		Alkalinity as $CaCO_3$	1			94
		Iron as Fe	1			0.41
		pH	1			8.3
		Phenols (ppb)	-	-	-	-
		Dissolved Oxygen	18	5	16	9.9
		Sulphate as SO_4	-	-	-	-

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Cataraqui R. at Dam at Kingston Mills	6/ 6/66 to 18/9/67	MF Coliform per 100 ml.	13	4	46,000	
		BOD 5	14	1.1	4.0	2.1
		Solids				
		- Total	14	106	420	163
		- Suspended	14	2	15	11
		Conductivity - mhos/cm^3	11	174	621	255
		Turbidity Units	12	1.8	20	5.2
		Phosphorus as PO_4				
		- Total	14	.00	.25	.09
		- Soluble	14	.00	.05	.02
		Nitrogen as N				
		- Free Ammonia	13	.02	.49	.17
		- Total Kjeldahl	14	.46	2.20	.99
		- Nitrite	13	.00	.01	.00
		- Nitrate	14	.00	.18	.06
		Chlorides as Cl	12	3	10	5
		Hardness as $CaCO_3$	1			100
		Alkalinity as $CaCO_3$	1			96
		Iron as Fe	1			0.33
		pH	1			8.4
		Phenols (ppb)	-	-	-	-
		Dissolved Oxygen	14	4	12	9
		Sulphate as SO_4	-	-	-	-

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Cataraqui R at Bridge below Brewers Mills	6/ 6/66 to 20/12/66	MF Coliform per 100 ml.	5	0	380	
		BOD 5	5	1.3	2.6	1.8
		Solids				
		- Total	5	110	160	132
		- Suspended	4	3	15	7
		Conductivity - mhos/cm^3	2	181	192	187
		Turbidity Units	2	4.0	9.5	6.8
		Phosphorus as PO_4				
		- Total	5	.04	.18	.10
		- Soluble	5	.00	.02	.01
		Nitrogen as N				
		- Free Ammonia	4	.00	.15	.07
		- Total Kjeldahl	5	.43	1.05	.77
		- Nitrite	4	.00	.01	.01
		- Nitrate	5	.00	.10	.02
		Chloride as Cl	3	2	4	3
		Hardness as $CaCO_3$	-	-	-	-
		Alkalinity as $CaCO_3$	-	-	-	-
		Iron as Fe	-	-	-	-
		pH	-	-	-	-
		Phenols (ppb)	-	-	-	-
		Dissolved Oxygen	5	7	7	7
		Sulphate as SO_4	-	-	-	-

WATER QUALITY DATA

LOCATION OF SAMPLING	SAMPLING DATES	ANALYSIS	NO. OF SAMPLES	MIN.	MAX.	MEAN
Cataraqui R. at Jones Falls	19/2/67 to 18/9/67	MF Coliform per 100 ml.	7	20	354,000	
		BOD 5	8	0.8	2.1	1.4
		Solids				
		- Total	8	84	180	142
		- Suspended	8	2	15	10
		Conductivity - mhos/cm^3	8	182	253	204
		Turbidity Units	8	1.5	9	3.1
		Phosphorus as PO_4				
		- Total	8	.02	.24	.10
		- Soluble	8	.00	.07	.03
		Nitrogen as N				
		- Free Ammonia	8	.06	.33	.16
		- Total Kjeldahl	7	.33	.98	.62
		- Nitrite	8	.00	.01	.00
		- Nitrate	8	.00	.20	.04
		Chloride as Cl	8	3	4	3
		Hardness as $CaCO_3$	-	-	-	-
		Alkalinity as $CaCO_3$	-	-	-	-
		Iron as Fe	-	-	-	-
		pH	-	-	-	-
		Phenols (ppb)	-	-	-	-
		Dissolved Oxygen	8	7	11	10
		Sulphate as SO_4	-	-	-	-